GEOS-Chem structure

main.f

Read met fields and initial conditions

Time loop: transport timestep

Write output if it's time

Met fields and surface quantities if it's time

Strat. B.C. if asked

Transport if it's time

Non-local PBL: dry deposition and emissions if it's time

PBL and convection if it's time

Old PBL: dry deposition and emissions if it's time

Chemistry if it's time

Wet deposition if it's time

Diagnostics if it's time
GEOS-Chem structure

main.f

- Read met fields and initial conditions
- Time loop: transport timestep
  - Write output if it's time
  - Met fields and surface quantities if it's time
  - Strat. B.C. if asked
  - Transport if it's time
  - Non-local PBL: dry deposition and emissions if it's time
  - PBL and convection if it's time
  - Old PBL: dry deposition and emissions if it's time
  - Chemistry if it's time
  - Wet deposition if it's time
  - Diagnostics if it's time

SMALLEST timestep !!!!!!
Meaning of “if it's time”

In input.geos (v8-02-02):

-----------------------------------------------+

%%% CONVECTION MENU %%% :

Turn on Cloud Conv? : T
Turn on PBL Mixing? : T
=> Use non-local PBL? : T
Convect Timestep (min) : 30
Meaning of “if it's time”

In input.geos (v8-02-02):

---

%%% CONVECTION MENU %%% :

- Turn on Cloud Conv? : T
- Turn on PBL Mixing? : T
- => Use non-local PBL? : T
- Convect Timestep (min) : 30

For convection, “if it's time” tests:

- if we want the convection in the simulation
- and if it is the good timestep
Meaning of “if it's time”

In input.geos (v8-02-02):

% % % CONVECTION MENU % % % :

Turn on Cloud Conv? : T
Turn on PBL Mixing? : T

=> Use non-local PBL? : T
Convect Timestep (min) : 30

For convection, “if it's time” tests:

• if we want the convection in the simulation
• and if it is the good timestep

For PBL mixing, “if it's time” tests:

• if we want the PBL mixing in the simulation
• what type of PBL we want
• and if it is the good timestep
Temporal structure of the code

Example for resolution 4x5 with typical values:
Transport, Convection = 30 min
Chemistry, Emission = 60 min.

\[ t=0 \quad 30 \quad 1:00 \quad 1:30 \quad \ldots \ldots \]

- Met Fields
- Strat. fluxes
- Transport
- PBL
- Convection
- Wet deposition
- Dry deposition
- Emissions
- Chemistry
- Wet deposition
- Accumulate diagnostics
- Write output
- Exit
The structure “philosophy” of each process

transport_mod.f:

- do_transport
  - init_transport
do_geos5_window_transport
  - do_window_transport
  - init_transport
    - geos4_geos5_global_adv
    - geos3_global_adv
    - gcap_global_adv
  - do_pjc_pfix
    - tpcore_geos5_window
    - tpcore_window
    - tpcore_geos5_global_adv
    - tpcore_fvdas
    - tpcore
    - do_pjc_pfix
      - tpcore_fvdas

“Driver” routines

“Active” routines
Unix command: grep

- To know which file does the error message come from.
- To know where (and in which file) to put a break point (e.g. TotalView)
- To know where a variable is defined and used.

Grep identifies which files contain a given pattern and gives the file names and the lines where the pattern appears.

Very simple and common use:

```
> grep -i 'my pattern' * [ | more ]
```

Case insensitive Pattern of interest Search all files in the directory Dispatch one screen of results only. Enter/space to continue

```
> grep -i emisrr * | more
```

CMN_O3:! EMISRRN = NOx emissions into sigma levels L=1, NOXEXTENT
CMN_O3:! EMISRR = All other tracer emissions into sigma level L=1
CMN_O3: REAL*8 EMISRR, EMISRRN
CMN_O3: & EMISRR (IIPAR,JIPAR,NEMPARA+NEMPARB),
CMN_O3: & EMISRRN(IIPAR,JIPAR,NOXEXTENT)
CMN_O3: into the EMISRR array for SMVGECAR. (bf, bmy, 11/1/05)
acetone_mod.f:! (3 ) OCEAN_SOURCE_ACET : Applies ocean source of acetone to EMISRR